

# PATENT COÖPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 30 MAY 2005

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PCT

Applicant's or agent's file reference 111256:EJH:PRW:rd	<b>FOR FURTHER ACTION</b>	See Form PCT/IPEA/416
International application No. <b>PCT/AU2004/000447</b>	International filing date (day/month/year) 6 April 2004	Priority date (day/month/year) 7 April 2003
International Patent Classification (IPC) or national classification and IPC  Int. Cl. <sup>7</sup> F25D 23/00		
Applicant  DNA HOLDINGS PTY LTD et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
  - a. ☒ (sent to the applicant and to the International Bureau) a total of 9 sheets, as follows:
    - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
    - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
  - b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
 

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand 5 November 2004	Date of completion of the report 20 May 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer  <b>MATTHEW FRANCIS</b> Telephone No. (02) 6283 2424

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/000447

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1 (b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 4, 5, 8-10 as originally filed/furnished

pages\* 1-3,3A,6,7 received by this Authority on 18 March 2005 with the letter of 18 March 2005

pages\* received by this Authority on with the letter of

☒ the claims:

pages as originally filed/furnished

pages\* as amended (together with any statement) under Article 19

pages\* 11-13 received by this Authority on 18 March 2005 with the letter of 18 March 2005

pages\* received by this Authority on with the letter of

☒ the drawings:

pages 1-6 as originally filed/furnished

pages\* received by this Authority on with the letter of

pages\* received by this Authority on with the letter of

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/figs

☐ the sequence listing (*specify*):

☐ any table(s) related to the sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/figs

☐ the sequence listing (*specify*):

☐ any table(s) related to the sequence listing (*specify*):

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/000447

**Box No. V** Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims 1-21	YES
	Claims	NO
Inventive step (IS)	Claims 1-21	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-21	YES
	Claims	NO

## 2. Citations and explanations (Rule 70.7)

D1: DE 19546984

D2: WO 2002/073104

NOVELTY (N), INVENTIVE STEP (IS)

Claims 1-21: D1 represents the closest available art and discloses a multi-drawer refrigeration device that uses flaps or valves to close the pathways of cooling air when drawers are in their open positions. The claimed invention differs from the cited art in that the compartment housing a drawer is isolated from the cooling means when said drawer is in an extended position while the prior art device requires that the drawer be almost completely removed from the refrigerated cabinet before any such isolation occurs. This earlier isolation confers advantages of efficiency that were not available from the prior art device. The claimed invention is also not obvious in view of the citation or the common general knowledge in the art. Hence the claimed invention is considered both novel and inventive.

**"Refrigerated Cabinet"**

**Field of the Invention**

This invention relates to a refrigerated cabinet.

**Background**

5 It is a characteristic of refrigerated cabinets such as domestic refrigerators that they provide a storage space and have a front door which is opened to enable access into the storage space. A difficulty with conventional domestic refrigerators arises from the circumstance that when the door is opened, all of the cold air contained within the storage cabinet is able to readily escape through the open front opening of the storage space. In addition in commercial situations it is an established practice to provide cool rooms with doors which facilitate access into the cool room for the purposes of extracting goods from the cool room and/or the purposes of entry. Furthermore in retail sites it is common practice to provide refrigerated cabinets which have a permanently open front opening to facilitate access by customers to the goods contained within that cabinet through the open front opening. In order to prevent the loss of cool air from the cabinet it is usual practice to generate a forced air flow through the space which tends to control the flow of cool air to limit its loss through the open front opening of the cabinet and/or to provide a curtain-like closure which provides a temporary closure to the space but which is readily capable of being displaced to enable access into the space.

Refrigerator and freezer arrangements have been proposed which segregate the storage space into a number of drawers each of which may be extended one or more at a time to gain access to the goods stored within the drawers. Another improvement is disclosed in German specification DE19546984 by Hans SIMON. This disclosure reveals several embodiments which incorporate means by which the refrigerated space is sealed when the drawer is removed or sufficiently extended for normal access to the drawers. While such appliances may reduce

the loss of cooled air in comparison to those of the conventional prior art, they still, by the nature of their design allow some loss. They essentially comprise a space which is substantially occupied by the drawer when the drawer is in the fully retracted position, leaving little additional free space. However, when a  
5 drawer is extended from the zone, the magnitude of free space within the zone is substantially increased. This requires air to be drawn in from outside the refrigerator. This air then mixes with the cooled air present in the refrigerator, and because the relative volume of the space vacated by the drawer compared with the volume of free space when all drawers are fully retracted within the zone  
10 is quite significant, the body of air is warmed substantially by the incoming air. Of course, when a drawer is returned to its retracted position, the additional air is expelled from the refrigerator. However, this air is a mixture of the warmed and cooled air, and thus there is a significant loss of cooled air from the refrigerator.

The preceding discussion of the background to the invention is intended only to  
15 facilitate an understanding of the present invention. It should be appreciated that the discussion is not an acknowledgement or admission that any of the material referred to was part of the common general knowledge in Australia as at the priority date of the application.

### **Disclosure of the Invention**

20 Accordingly the invention resides in a refrigerated cabinet comprising a storage space having a front opening through which access is gained to the space, the space including a zone subdivided into at least one compartment, each compartment adapted to be occupied by a drawer, each drawer being moveable within the compartment from a retracted position at which it is accommodated  
25 within the compartment and an extended position at which it extends forwardly from the zone, and whereby the interior of the drawer is accessible from an upper portion of the drawer, the cabinet further comprising cooling means wherein when the drawer is in the retracted position, the cooling means is in communication with the drawer and when the drawer is in an extended position the cooling  
30 means is isolated from the compartment by isolation means.

According to a preferred feature of the invention the isolation means is associated with the compartment.

According to a preferred feature of the invention said cooling means comprises a plenum formed between the walls of the storage space and the at least one compartment, said communication being between the plenum and the at least one compartment.

According to a further preferred embodiment, the plenum is defined by a wall of the storage space and an opposed wall, said opposed wall being provided with a set of closures which are in one to one relationship with the compartments, said closures being moveable between a closed position and an open position wherein when the drawers are in the retracted position they cooperate to move the closures to the open position to provide said communication when said drawers are moved from the retracted position the closures are closed to prevent said communication.

- 3A-

According to a preferred embodiment, at least a portion of the upper face of the compartment is open. According to a preferred embodiment, the portion of the upper face communicates with the source when the drawer is in the retracted position.

- 5 According to a preferred embodiment, the front opening of the at least one compartment sealingly cooperates with the front opening when the drawer is in the retracted position.

- 10 According to a preferred embodiment, a plurality compartments are accommodated within the zone. According to a preferred embodiment, the compartments are supported in a vertical array.

According to a further embodiment, the front opening is associated with a door which controls said access. According to a further preferred embodiment, the door accommodates one or more storage zones, the space defined between the door and front opening communicating with the remainder of the space.

- 15 According to an embodiment the storage zones are closed by a closure which is capable of being opened wherein the interior of the storage zones communicate with the storage space. According to a preferred embodiment the communication between the remainder of the space and the space defined between the door and front opening and/or storage zones is through passageways provided in the door.

- 20 According to a preferred feature of the invention the cooling means comprises a duct element and the isolation means comprises a valve associated with said duct element, and the drawer comprises a member adapted to open said valve when the drawer is in the retracted position and the valve comprises means to close said valve when the drawer is not in the retracted position.

Each compartment 15 slidably supports a drawer 31 which is moveable from a retracted position at which it is fully accommodated within the compartment 15 (as shown in Figure 1) and an extended position at which it extends forwardly from the compartment (as shown in the case of the uppermost compartment of Figure 2). Each drawer comprises a lower wall, a front wall 35 and a rear wall 33 has an open top. The front face 35 of each drawer sealingly cooperates with the front opening of the cabinet such that when the drawer is in its retracted position the compartment is sealingly closed at the front face. The rear wall of 33 of each drawer cooperates with the closure 17 of each compartment to move the closure 10 to its open position when the drawer is in its retracted position. Each closure 17 is biased such that on the drawer being moved towards its extended position out of engagement with the closure the closure will move to its closed position.

As a result of the embodiment the space within the refrigerated cabinet is divided into a plurality of spaces which are each defined by the drawers 31. Access to 15 the drawers 31 is gained by opening the door 13 of the cabinet and moving the respective drawer 31 to its extended position. In so doing the communication between the plenum 23 and the respective compartment 15 is closed as a result of the closing of the closure 17. Access to the contents of drawer 31 are gained through the open top of the drawer. As a result communication between the 20 plenum 23 and each compartment is only effected when the drawer contained within the compartment is in its retracted position. Therefore when the door 13 of the cabinet is open substantially little cold air is lost from the storage space within the cabinet even when access is gained to the interior of a drawer. With the door 13 open and a drawer 31 in its extended position the plenum 23 is closed and 25 access to the drawer is through the open top only and therefore little cool air is lost through the compartment. The most significant loss of cool air is a result of disturbance of the contents of the drawer.

In addition the door 13 supports a set of storage zones (not shown) which are each associated with a separate closure which enables access into each storage 30 zone. Each storage zone is connected to a duct in the door which connects with a corresponding positioned passageway in the upper wall of the cabinet when the door is closed and which communicates with the space around the vaporiser to



enable cool air to flow into each storage zone to cool the contents thereof. If desired the passageway can also communicate with the space defined between the door and the front opening of the cabinet when the door is in its closed position.

- 5 According to a second embodiment of the invention (not shown) the closure of each compartment may be accommodated by the rear wall of the drawer which cooperates with the walls of the compartment to sealingly close the compartment on a drawer being moved from the retracted position to the extended position but when the drawer is in the closed position opens to provide communication  
10 between the source of cool air and the interior of the drawer.

- According to a third embodiment of the invention the drawer substantially cooperates with the walls of the compartment to substantially prevent any substantial movement of cool air from the plenum past the drawer and through the front opening. The engagement need not be a sealing engagement. In  
15 addition the upper face cooperates with the upper wall of the compartment whereby when on the drawer moving to the retracted position the upper open face of the drawer opens into the plenum space. According to this embodiment no closure is provided between the respective compartment and the plenum space to isolate the compartment from the plenum space when the drawer is  
20 moved towards its extended position.

Each of the embodiments of the invention described above can be applied to a domestic refrigerated cabinet, domestic freezers, commercial cool rooms, commercial refrigerated cabinets and the like.

- However, by the application of the invention a number of the constraints to the design of refrigerator systems are removed and a designer is able to provide  
25 quite innovative designs which embrace the invention. In a fourth embodiment, as shown in Figure 3, a refrigeration system is provided which embraces the freedoms provided by the invention. The embodiment comprises at least one compartment 111 providing a storage space which in use is installed within a  
30 suitable enclosure 112. Unlike the embodiments previously described, the

**The claims defining the invention are as follows:**

1. A refrigerated cabinet comprising a storage space having a front opening through which access is gained to the space, the space including a zone subdivided into at least one compartment, each compartment adapted to be  
5 occupied by a drawer, each drawer being moveable within the compartment from a retracted position at which it is accommodated within the compartment and an extended position at which it extends forwardly from the zone, and whereby the interior of the drawer is accessible from an upper portion of the drawer, the cabinet further comprising cooling means wherein when the drawer is in the  
10 retracted position, the cooling means is in communication with the drawer and when the drawer is in an extended position the cooling means is isolated from the compartment by isolation means.
2. A refrigerated cabinet as claimed at claim 1 wherein a portion of the compartment is associated with a closure, said closure being moveable between  
15 an open position and a closed position wherein when the drawer is in its retracted position the closure is moved to the opened position to provide said communication with the drawer and when the drawer is in its extended position the closure is in its closed position to thereby isolate the compartment from the cooling means.
- 20 3. A refrigerated cabinet as claimed at claim 1 or claim 2 wherein said cooling means comprises a plenum formed between the walls of the storage space and the at least one compartment said communication being between the plenum and the at least one compartment.
- 25 4. A refrigerated cabinet as claimed at claim 3 wherein the closure comprises at least a portion of the rear wall of the drawer and the plenum is located between the rear wall of the drawer and the face of the rear walls of the at least one compartment.

5. A refrigerated cabinet as claimed at claim 3 or claim 4 wherein the plenum is defined by a wall of the storage space and an opposed wall, said opposed wall being provided with a set of closures, each compartment being associated with at least one closure, each closure being moveable between a closed position and an open position wherein when a drawer is in the retracted position it cooperates to move the at least one respective closure to the open position to provide said communication and when said drawer is moved from the retracted position the respective at least one closure is closed to prevent said communication.
6. A refrigerated cabinet as claimed at any one of the previous claims wherein at least a portion of the upper face of the compartment is open.
7. A refrigerated cabinet as claimed at any one of the previous claims wherein the portion of the upper face communicates with the source when the drawer is in the retracted position.
8. A refrigerated cabinet as claimed at any one of the previous claims wherein the front opening of the at least one compartment sealingly cooperates with the front opening when the drawer is in the retracted position.
9. A refrigerated cabinet as claimed at any one of the previous claims wherein a plurality compartments are accommodated within the zone.
10. A refrigerated cabinet as claimed at any one of the previous claims wherein the compartments are supported in a vertical array.
11. A refrigerated cabinet as claimed at any one of the previous claims wherein the front opening is associated with a door which controls said access.
12. A refrigerated cabinet as claimed at claim 11 wherein the door accommodates one or more storage zones, the space defined between the door and front opening communicating with the remainder of the space.

13. A refrigerated cabinet as claimed at claim 12 wherein the storage zones are closed by a closure which is capable of being opened wherein the interior of the storage zones communicate with the storage space.

5 14. A refrigerated cabinet as claimed at claim 13 wherein the communication between the remainder of the space and the space defined between the door and front opening and/or storage zones is through passageways provided in the door.

15. A refrigerated cabinet as claimed at claim 1 wherein the isolation means is associated with the cooling means.

10 16. A refrigerated cabinet as claimed at claim 1 wherein the isolation means is associated with the compartment.

15 17. A refrigerated cabinet as claimed at claim 15 wherein the cooling means comprises a duct element adapted to convey chilled air and the isolation means comprises a valve associated with said duct element, and the drawer comprises a means operative to open said valve when the drawer is in the retracted position and the valve comprises means to close said valve when the drawer is not in the retracted position.

18. A refrigeration system comprising a plurality of refrigerated cabinets as claimed in any one of the previous claims wherein the cooling means is provided to each refrigerated cabinet from a common cooling source.

20 19. A refrigerated cabinet substantially as herein described.

20. A refrigerated cabinet substantially as herein described with reference to the accompanying drawings.

21. A refrigeration system substantially as herein described.